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(54) THERMOPLASTIC RESIN COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a thermoplastic resin composition, especially a polyamide resin composition and a hollow formed product therefrom, having an electroconductivity, and excellent in well-balanced surface smoothness, tenacity, extrusion forming property, antistatic property, etc.

SOLUTION: This thermoplastic resin composition contains 1-100 pts.wt. electroconductive filler based on 100 pts.wt. polyamide resin. A gut is obtained by putting such composition into a melt indexer (temperature = melting point + 60°C, staying time; 5 min, load; 5 kg, orifice diameter; 0.0825 inch, length; 0.315 inch), and the number of projected parts having $\geq 25 \mu\text{m}$ height is ≤ 5 in 1 cm gut on observing the gut by projecting image thereof by a projector. A hollow formed product is produced by using the composition.

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CLAIMS

[Claim(s)]

[Claim 1] (A) It is the resin constituent which carries out 1-100 weight section content of the (B) conductivity filler to the thermoplastics 100 weight section. It is a melt indexer (temperature = by the melting point of +60 degrees C, and the 5 residence time) about this constituent. The thermoplastics constituent whose projection with a height of 25 micrometers or more observed on a gut front face is five or less per gut 1cm when it supplies to 5kg of loads, the orifice diameter of 0.0825 inches, and die length of 0.315 inches, a gut is obtained and the gut is projected with a projector.

[Claim 2] (A) The thermoplastics constituent according to claim 1 whose thermoplastics is polyamide resin.

[Claim 3] The thermoplastics constituent according to claim 2 which is polyamide resin with which polyamide resin consists of a structural unit the range of whose carbon number per amide group is 8-15.

[Claim 4] The conductive thermoplastics constituent according to claim 3 whose relative viscosity which polyamide resin measured at 25 degrees C among (0.5 % of the weight of polymer concentration) the metacresol is polyamide resin of the range of 1.5-5.0.

[Claim 5] The thermoplastics constituent according to claim 2 whose polyamide resin is the PORIKA pro amide copolymer a PORIKA pro amide homopolymer or whose KAPURO amide unit is more than 50 mol % and whose relative viscosity measured 98% at a concentrated-sulfuric-acid solution (polymer 1g, 100ml of concentrated sulfuric acid) and 25 degrees C is polyamide resin of the range of 2.0-5.5.

[Claim 6] claims 1-5 which come to carry out 1-100 weight section combination to the (A) thermoplastics 100 weight section in the thermoplastics which furthermore contains the (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate -- either -- the conductive thermoplastics constituent of a publication.

[Claim 7] (A) The thermoplastics constituent according to claim 6 whose thermoplastics is polyamide resin and whose thermoplastics containing the (C) functional group is an acid-anhydride radical content olefin system copolymer.

[Claim 8] (B) claims 1-7 to which a conductive filler is characterized by powder, a grain, tabular, the shape of a scale, and die length / diameter ratio being the conductive fillers of 200 or less one of fibrous gestalten -- either -- the thermoplastics constituent of a

publication.

[Claim 9] (B) claims 1-8 characterized by a conductive filler being carbon powder -- either -- the thermoplastics constituent of a publication.

[Claim 10] The thermoplastics constituent according to claim 9 characterized by being the carbon powder whose carbon powder is specific surface area of 500-1500m² / g called for with the BET adsorption method.

[Claim 11] claims 9-10 characterized by carbon powder being carbon powder which is the DBP oil absorption of 370ml / 100g or more -- either -- the thermoplastics constituent of a publication.

[Claim 12] claims 1-11 whose volume resistivity is 10¹⁰ or less ohm-cm -- either -- the thermoplastics constituent of a publication.

[Claim 13] claims 1-12 whose melt viscosity measured under 270 degrees C and the conditions of the 1000/second of shear rates is 1000-20000poise -- either -- the thermoplastics constituent of a publication.

[Claim 14] (A) Thermoplastics, (B) conductivity filler, and the (C) epoxy group, It is the thermoplastics constituent which consists of thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate. (A) The constituent and the (C) epoxy group which were able to obtain thermoplastics and (B) conductivity filler after melting kneading, claims 1-13 obtained by carrying out melting kneading of the thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate -- either -- the conductive thermoplastics constituent of a publication.

[Claim 15] claims 1-14 which are the resin constituents according to claim 1 to 14 obtained by melting kneading, and are characterized by weighted mean particle diameter using a particle or powder 2mm or less as (A) thermoplastics before melting kneading -- either -- the thermoplastics constituent of a publication.

[Claim 16] (A) Thermoplastics, (B) conductivity filler, and the (C) epoxy group, It is the manufacturing method of the thermoplastics constituent which consists of thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate. (A) The constituent and the (C) epoxy group which were able to obtain thermoplastics and (B) conductivity filler after melting kneading, The manufacturing method of the thermoplastics constituent characterized by carrying out melting kneading of the thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate.

[Claim 17] (A) The manufacturing method of the thermoplastics constituent which is a manufacturing method by melting kneading of thermoplastics and the resin constituent which contains (B) conductivity filler as an indispensable component, and is characterized by weighted mean particle diameter using granulation or powder 2mm or less as (A) thermoplastics before melting kneading.

[Claim 18] claims 1-15 -- either -- the thermoplastics constituent for blow molding of a publication.

[Claim 19] claims 1-15 -- either -- the thermoplastics constituent for multilayer blow molding of a publication.

[Claim 20] a claim -- the blow molding object manufactured using the thermoplastics constituent of a publication one to 15 either.

[Claim 21] a claim -- the multilayer blow molding object manufactured by the coextrusion process using the thermoplastics constituent of a publication one to 15 either.

[Claim 22] (b) a claim -- the multilayer blow molding object manufactured by the coextrusion process using at least two sorts of resin constituents of the resin constituent which contains the thermoplastics constituent and (low 1) polyphenylene sulfide resin of a publication at least 30% of the weight or more one to 15 either.

[Claim 23] (b) a claim -- the multilayer blow molding object manufactured by the coextrusion process using at least two sorts of resin constituents of the resin constituent which contains the thermoplastics constituent and (low 2) polyamide resin of a publication at least 30% of the weight or more one to 15 either.

[Claim 24] claims 16-17 -- either -- the manufacturing method of the thermoplastics constituent for blow molding of a publication.

[Claim 25] claims 16-17 -- either -- the manufacturing method of the thermoplastics constituent for multilayer blow molding of a publication.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention has conductivity and relates to the especially suitable ingredient for blow molding about the thermoplastics constituent which surface smooth nature, toughness, extrusion-molding nature, an antielectricity characteristic, etc. were balanced, and was excellent, especially a polyamide resin constituent.

[0002]

[Description of the Prior Art] The technique of manufacturing the blow molding article of thermoplastics centering on the ducts in the engine room of an automobile by the blow molding which used polyamide system resin, and the technique manufactured by extrusion molding which used saturated polyester system resin, polyamide resin, polyolefin resin, and thermoplastic polyurethane for tubes have spread.

[0003] Especially as an object for motor fuel tubes, although flexible polyamide resin, such as a polyamide 11 and a polyamide 12, is used widely also in polyamide resin, a Plastic solid being charged in the application for which non-conductive liquids, such as a fuel, flow in the inside of a blow blow molding object or a tube Plastic solid, and controlling this is called for.

[0004] Then, we began examination about the resin constituent with which the conductive filler was blended with thermoplastics so that we may get the thermoplastics constituent suitable for the blow molding method conductivity was improved. Although mixing a

conductive filler in thermoplastics is known for JP,54-113640,A Although it does not actualize by the shaping approach forced on metal mold with high pressure like injection molding, if this constituent is applied to the shaping approach which a high pressure does not require for a front face like the blow molding method like blow molding or tube shaping in our examination Or it was easy to generate irregularity on a front face and sufficient front-face nature smooth nature was not obtained, problems, like there is constraint of an extruding press machine kind with narrow extrusion-molding condition width of face arose, and it became clear that it was simply inapplicable. Moreover, it turned out that surface irregularity has a bad influence also on the reinforcement of a Plastic solid.

[0005] When using the blow molding object fabricated from thermoplastics, such as polyamide resin, on the other hand for the application of the circumference of internal combustion engines, such as a motor fuel tube, the point referred to as not enough to the transparency tightness of an alcoholic gasoline demanded from an environmental pollution problem and the improvement in fuel consumption feeling uneasy is also pointed out, and the amelioration is also desired.

[0006] Then, we recollected also about the multilayer blow molding of polyphenylene sulfide resin (it is hereafter called PPS resin for short) excellent in thermal resistance, hot water resistance, chemical resistance, etc., and conductive thermoplastics as an approach of solving the problem of transparency prevention of the above-mentioned antielectricity characteristic and an alcoholic gasoline at once, we inquired so that we may get the thermoplastics constituent also suitable for this multilayer blow molding nature, and we reached this invention.

[0007]

[Problem(s) to be Solved by the Invention] This invention makes a technical problem amelioration of the fall of the surface smooth nature which produces it when the constituent which consists of the thermoplastics and the conductive filler which were mentioned above is applied to especially the blow molding approach, and a fall on the strength. Furthermore, let acquisition of the thermoplastics constituent excellent also in multilayer blow molding nature be a technical problem. That is, this invention relates to the especially suitable ingredient for blow molding, especially multilayer blow molding about the thermoplastics constituent which was conductivity, and surface smooth nature, toughness, extrusion-molding nature, an antielectricity characteristic, etc. were balanced, and was excellent.

[0008]

[Means for Solving the Problem] That is, this invention offers the following thermoplastics constituent and its manufacturing method, and a Plastic solid.

[0009] (1) It is the resin constituent which carries out 1-100 weight section content of the (B) conductivity filler to the (A) thermoplastics 100 weight section. It is a melt indexer (temperature = by the melting point of +60 degrees C, and the 5 residence time) about this constituent. The thermoplastics constituent whose projection with a height of 25

micrometers or more observed on a gut front face is five or less per gut 1cm when it supplies to 5kg of loads, the orifice diameter of 0.0825 inches, and die length of 0.315 inches, a gut is obtained and the gut is projected with a projector.

[0010] (2) Thermoplastics constituent of the above-mentioned (1) publication whose (A) thermoplastics is polyamide resin.

[0011] (3) The thermoplastics constituent according to claim 2 which is polyamide resin with which polyamide resin consists of a structural unit the range of whose carbon number per amide group is 8-15.

[0012] (4) The conductive thermoplastics constituent of the above-mentioned (3) publication whose relative viscosity which polyamide resin measured at 25 degrees C among (0.5 % of the weight of polymer concentration) the metacresol is polyamide resin of the range of 1.5-5.0.

[0013] (5) polyamide resin -- PORIKA -- a pro -- an amide -- a homopolymer -- or -- KAPURO -- an amide -- a unit -- 50 -- a mol -- % -- more than -- it is -- PORIKA -- a pro -- an amide -- a copolymer -- it is -- and -- 98 -- % -- concentrated sulfuric acid -- a solution (polymer 1g, 100ml of concentrated sulfuric acid) -- 25 -- degree C -- having measured -- relative viscosity -- 2.0 - 5.5 -- the range -- polyamide resin -- it is -- the above -- (-- two --) -- a publication -- thermoplastics -- a constituent .

[0014] (6) -- above-mentioned (1) - (5) which comes to carry out 1-100 weight section combination to the (A) thermoplastics 100 weight section in the thermoplastics which contains further the (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate -- either -- the conductive thermoplastics constituent of a publication.

[0015] (7) Thermoplastics constituent of the above-mentioned (6) publication whose (A) thermoplastics is polyamide resin and whose thermoplastics containing the (C) functional group is an acid-anhydride radical content olefin system copolymer.

[0016] (8) -- above-mentioned (1) - (7) to which (B) conductivity filler is characterized by powder, a grain, tabular, the shape of a scale, and die length / diameter ratio being the conductive fillers of 200 or less one of fibrous gestalten -- either -- the thermoplastics constituent of a publication.

[0017] (9) -- above-mentioned (1) - (8) characterized by (B) conductivity filler being carbon powder -- either -- the thermoplastics constituent of a publication.

[0018] (10) The thermoplastics constituent of the above-mentioned (9) publication characterized by being the carbon powder whose carbon powder is specific-surface-area 500-1500m²/g called for with the BET adsorption method.

[0019] (11) above-mentioned (9) - (10) characterized by carbon powder being carbon powder which is the DBP oil absorption of 370ml / 100g or more -- either -- the thermoplastics constituent of a publication.

[0020] (12) above-mentioned (1) - (11) whose volume resistivity is 1010 or less ohm-cm -- either -- the thermoplastics constituent of a publication.

[0021] (13) above-mentioned the (1) -(12 whose melt viscosity measured under 270 degree

C and the conditions of the 1000/second of shear rates is 1000-20000poise --) -- either -- the thermoplastics constituent of a publication.

[0022] (14) (A) thermoplastics, (B) conductivity filler, and the (C) epoxy group, It is the thermoplastics constituent which consists of thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate. (A) The constituent and the (C) epoxy group which were able to obtain thermoplastics and (B) conductivity filler after melting kneading, above-mentioned the (1) -(13) obtained by carrying out melting kneading of the thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate --) -- either -- the conductive thermoplastics constituent of a publication.

[0023] (15) above-mentioned (1) - (14) which is the resin constituent given [above-mentioned] in (1) - (14) obtained by melting kneading, and is characterized by weighted mean particle diameter using a particle or powder 2mm or less as (A) thermoplastics before melting kneading -- either -- the thermoplastics constituent of a publication.

[0024] (16) (A) thermoplastics, (B) conductivity filler, and the (C) epoxy group, It is the manufacturing method of the thermoplastics constituent which consists of thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate. (A) The constituent and the (C) epoxy group which were able to obtain thermoplastics and (B) conductivity filler after melting kneading, The manufacturing method of the thermoplastics constituent characterized by carrying out melting kneading of the thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate.

[0025] (17) Manufacturing method of the thermoplastics constituent which is a manufacturing method by melting kneading of (A) thermoplastics and the resin constituent which contains (B) conductivity filler as an indispensable component, and is characterized by weighted mean particle diameter using granulation or powder 2mm or less as (A) thermoplastics before melting kneading.

[0026] (18) Above-mentioned (1) - (15) It is the thermoplastics constituent for blow molding of a publication either.

(19) Above-mentioned (1) - (15) It is the thermoplastics constituent for multilayer blow molding of a publication either.

[0027] (20) Above-mentioned (1) - (15) It is the blow molding object manufactured using the thermoplastics constituent of a publication either.

[0028] (21) Above-mentioned (1) - (15) It is the multilayer blow molding object manufactured by the coextrusion process using the thermoplastics constituent of a publication either.

[0029] (22) -- (**) -- above-mentioned (1) - (15) -- either -- the multilayer blow molding object manufactured by the coextrusion process using at least two sorts of resin constituents of the resin constituent which contains the thermoplastics constituent and (low

1) polyphenylene sulfide resin of a publication at least 30% of the weight or more.

[0030] (23) -- (**) -- above-mentioned (1) - (15) -- either -- the multilayer blow molding object manufactured by the coextrusion process using at least two sorts of resin constituents of the resin constituent which contains the thermoplastics constituent and (low 2) polyamide resin of a publication at least 30% of the weight or more.

[0031] (24) Above-mentioned (1) - (17) It is the manufacturing method of the thermoplastics constituent for blow molding of a publication either.

[0032] (25) Above-mentioned (1) - (17) It is the manufacturing method of the thermoplastics constituent for multilayer blow molding of a publication either.

[0033]

[Embodiment of the Invention] Although there is especially no limit as (A) thermoplastics used by this invention, as the example Saturated polyester resin, polysulfone resin, polytetrafluoro ethylene resin, Polyetherimide resin, polyamidoimide resin, polyamide resin, Polyimide resin, polycarbonate resin, polyether sulphone resin, Polyether ketone resin, poly thioether ketone resin, polyether ether ketone resin, Thermoplastic polyurethane, polyolefin resin, ABS plastics, a polyamide elastomer, a polyester elastomer, etc. are mentioned, and these may be used as two or more sorts of mixture. Polyamide resin, thermoplastic polyester resin, thermoplastic polyurethane, and polyolefin resin are desirable, and polyamide resin is used especially preferably.

[0034] Polyamide resin is a polyamide which makes a main constituent amino acid, a lactam or diamine, and dicarboxylic acid here. As an example of representation of the main constituent, 6-aminocaproic acid, 11-amino undecanoic acid, Amino acid, such as 12-amino dodecanoic acid and an paraamino methyl benzoic acid, Lactams, such as epsilon caprolactam and omega-RAURO lactam, a tetramethylenediamine, Hexa MEREN diamine, undecamethylene diamine, dodeca methylene diamine, 2, 2, 4-/4, a 4-trimethyl hexamethylenediamine, 5-methyl nonamethylene diamine, [2 and 4] Meta-xylene diamine, PARAKI silylene diamine, 1, a 3-bis(aminomethyl) cyclohexane, 1, a 4-bis(aminomethyl) cyclohexane, 1-friend no 3-aminomethyl 3 and 5, 5-trimethylcyclohexane, Bis(4-amino cyclohexyl) methane, bis(3-MECHIRU 4-amino cyclohexyl) methane, A 2 and 2-bis(4-amino cyclohexyl) propane, a bis(aminopropyl) piperazine, Aliphatic series, such as an aminoethyl piperazine and 2-methyl pentamethylene diamine, The diamine of an alicycle group and aromatic series and an adipic acid, a SUPERIN acid, an azelaic acid, A sebacic acid, dodecane diacid, a terephthalic acid, isophthalic acid, 2-chloro terephthalic acid, 2-methyl terephthalic acid, 5-methyl isophthalic acid, 5-sodium sulfoisophtharate, The dicarboxylic acid of aliphatic series, such as a hexahydro terephthalic acid and hexahydro isophthalic acid, an alicycle group, and aromatic series is mentioned, and the polyamide homopolymer or copolymer guided from these raw materials can be respectively used in the form of independent or mixture in this invention.

[0035] In this invention, a PORIKA pro amide (nylon 6), polyhexamethylene adipamide (Nylon 66), polytetra ethylene adipamide (Nylon 46), polyhexamethylene sebacamide (Nylon 610), polyhexamethylene DODEKAMIDO (Nylon 612), the poly dodecane amide

(Nylon 12), the poly undecane amide (Nylon 11), polyhexamethylene terephthalamide (nylon 6 T), poly xylylene adipamide (nylon XD6) and such mixture thru/or a copolymer, etc. are mentioned as useful polyamide resin.

[0036] Especially, it is suitable in the semantics which acquires the toughness which excelled ** in the polyamide resin with which the carbon number per amide group consists of a structural unit which is the range of 8-15, or the poly dodecane amide (Nylon 12), the poly undecane amide (Nylon 11), a PORIKA pro amide (nylon 6), Nylon 610, nylon 6 T / 12 copolymer, etc. can be illustrated as a polyamide.

[0037] the relative viscosity which there is no limit especially in the polymerization degree of these polyamide resin, for example, was measured 98% at a concentrated-sulfuric-acid solution (polymer 1g, 100ml of concentrated sulfuric acid), and 25 degrees C -- the range of 1.5-7.0 -- especially -- 2.0-6.5 -- further -- the relative viscosity which could illustrate the range of 2.0-5.5, or was measured at 25 degrees C among (0.5 % of the weight of polymer concentration) the metacresol -- the range of 1.0-7.0 -- the polyamide resin of the range of 1.5-5.0 can be illustrated especially.

[0038] Especially, it is polyamide resin with which the carbon number per amide group consists of a structural unit which is the range of 8-15, and the relative viscosity measured at 25 degrees C is desirable among (0.5 % of the weight of polymer concentration) the metacresol especially in the semantics which obtains the surface [hyperviscous polyamide resin was comparatively excellent in] smooth nature of the range of 1.5-5.0, toughness, and a blow molding object moldability.

[0039] Moreover, thermoplastic polyester resin means the polyester obtained from dicarboxylic acid and aliphatic series diols, such as a terephthalic acid. As dicarboxylic acid other than a terephthalic acid, alicyclic dicarboxylic acid, such as aromatic series dicarboxylic acid, such as aliphatic series dicarboxylic acid of the carbon numbers 2-20 of an azelaic acid, a sebacic acid, an adipic acid, dodecane dicarboxylic acid, isophthalic acid, etc., isophthalic acid, and naphthalene dicarboxylic acid, or cyclohexane dicarboxylic acid, etc. may be mentioned, and these may be independent or may be mixture. As aliphatic series diol, ethylene glycol, propylene glycol, 1,4-butanediol, trimethylene-glycol, 1, and 4-cyclohexane dimethanol, hexamethylene glycol, etc. are mentioned. As an example of the desirable thermoplastic polyester used by this invention Although polyethylene terephthalate, polypropylene terephthalate, polybutylene terephthalate, polyhexamethylene terephthalate, polycyclohexylene dimethylene terephthalate, polyethylenenaphthalate, etc. are mentioned The polybutylene terephthalate or the terephthalic acid which has a moderate mechanical strength especially More than 60 mol % The copolymerized polyester which consists of a dicarboxylic acid component which contains more than 70 mol %, dodecane dicarboxylic acid, and/or isophthalic acid preferably, and a 1,4-butanediol component is used especially preferably.

[0040] Although there is no limit especially in the degree of polymerization of these thermoplastic polyester resin, in the case of the polybutylene terephthalate (it is called the PBT resin for short below) and copolymerized polyester which are used preferably

especially, for example, the thing of the range of 0.5-2.5, especially the range of 0.8-2.0 has the relative viscosity desirable [the degree of polymerization] which measured the alt.chlorophenol solution at 25 degrees C 0.5%. Moreover, in the case of polyethylene terephthalate, the thing of the range of 0.54-1.5, especially the range of 0.6-1.2 has the desirable limiting viscosity which measured the alt.chlorophenol solution at 25 degrees C 0.5%.

[0041] Moreover, thermoplastic polyurethane is a chain polymer which consists of poly isocyanate and diol, and 2, 4-tolylene diisocyanate, hexamethylene di-isocyanate, meta-xylenediisocyanate and 4, and 4'-diphenylmethane diisocyanate etc. is mentioned as an example of the poly isocyanate. There are a polyester mold and a polyether mold in diol, and, generally what consists of glycols, such as organic acids, such as a phthalic acid, an adipic acid, a dimerization Reno Inn acid, and a maleic acid, ethylene and a propylene, a butylene, and diethylene, etc. is used for a polyoxypropylene glycol, the Pori (oxypropylene) Pori (oxy-methylene) glycol, the Pori (oxy-butylene) glycol, the Pori (oxy-tetramethylen) glycol, etc. as a latter example as a former example, respectively.

[0042] Although there is especially no limit in the polymerization degree of these thermoplasticity polyurethane, that whose melt viscosity in 220 degrees C, a shear rate 10 / sec is usually 1000-100000poise is used.

[0043] Moreover, as polyolefin resin, polyethylene, polypropylene, chlorinated polyethylene, chlorination polypropylene, the poly methyl pentene, etc. are mentioned.

[0044] Next, (B) conductivity filler is explained. If a conductive filler is a conductive filler usually used for electric conduction-ization of resin, there will be especially no limit and the inorganic filler covered with a metal powder, a metal flake, a metal ribbon, a metal fiber, a metallic oxide, and the conductive matter, carbon powder, a graphite, a carbon fiber, a carbon flake, scale-like carbon, etc. will be mentioned as the example.

[0045] As an example of the metal kind of a metal powder, a metal flake, and a metal ribbon, silver, nickel, copper, zinc, aluminum, stainless steel, iron, brass, chromium, tin, etc. can be illustrated.

[0046] As an example of the metal kind of a metal fiber, iron, copper, stainless steel, aluminum, brass, etc. can be illustrated.

[0047] Surface treatment may be performed to this metal powder, the metal flake, the metal ribbon, and the metal fiber by finishing agents, such as a titanate system, an aluminum system, and a silane system.

[0048] As an example of a metallic oxide, SnO₂ (antimony dope), In₂O₃ (antimony dope), ZnO (aluminum dope), etc. can be illustrated, and surface treatment may be performed to these by finishing agents, such as a titanate system, an aluminum system, and a silane system.

[0049] As an example of the conductive matter in the inorganic filler covered with the conductive matter, aluminum, nickel, silver, carbon, SnO₂ (antimony dope), In₂O₃, etc. can be illustrated (antimony dope). Moreover, as an inorganic filler covered, a mica, a glass bead, a glass fiber, a carbon fiber, titanate-acid KARIWISUKA, a barium sulfate, a

zinc oxide, titanium oxide, a boric-acid aluminum whisker, a zinc oxide system whisker, a titanium oxide acid system whisker, a silicon carbide whisker, etc. can be illustrated. As the covering approach, a vacuum deposition method, the sputtering method, an electroless deposition method, the burning method, etc. are mentioned. Moreover, surface treatment may be performed to these by finishing agents, such as a titanate system, an aluminum system, and a silane system.

[0050] Carbon powder is classified into acetylene black, gas black, oil black, naphthalene black, thermal black, furnace black, lamp black, channel black, roll black, disk black, etc. from the raw material and a manufacturing method. The carbon powder which can be used by this invention is used especially suitably [acetylene black and furnace black], although the raw material and especially a manufacturing method are not limited. Moreover, the various carbon powder with which carbon powder differs in properties, such as the particle diameter, surface area, DBP oil absorption, and ash content, is manufactured. Especially although the carbon powder which can be used by this invention does not have especially a limit in these properties, 5-100nm and further 10-70nm have the point of the balance of reinforcement and electrical conductivity to desirable mean particle diameter 500nm or less. Moreover, especially surface area (BET adsorption method) has desirable 500-1500m² / g more than 3010 morem² / g more than 10m² / g. moreover, DBP oil absorption -- 50ml/-- 100ml / 100g, and 370 moreml / 100g or more are especially desirable 100g or more. Moreover, 0.3% or less of especially ash content is desirable 0.5% or less.

[0051] Surface treatment may be performed to this carbon powder by finishing agents, such as a titanate system, an aluminum system, and a silane system. Moreover, it is also possible to use that which was corned in order to raise melting kneading workability.

[0052] Moreover, as for the conductive filler used by this invention from a viewpoint which obtains the outstanding surface smooth nature, it is more desirable than the fibrous filler which has a high aspect ratio that the die length / diameter ratios in powder, a grain, tabular, the shape of a scale, and a resin constituent are 200 or less one of fibrous gestalten.

[0053] Two or more sorts may be used together and used for the above-mentioned conductive filler. In this conductive filler, carbon powder is used especially suitable for especially reinforcement and a cost target.

[0054] although a convention is impossible generally since the content of the conductive filler used by this invention changes with classes of conductive filler to be used -- the (A) thermoplastics 100 weight section from the point of balance with conductivity, a fluidity, a mechanical strength, etc. -- receiving -- the 1 - 100 weight section -- desirable -- 2 - 50 weight section -- the range of 2 - 20 weight section is chosen preferably.

[0055] Moreover, as for this resin constituent, it is desirable that the volume resistivity is 10¹⁰ or less ohm-cm in the semantics which obtains sufficient antistatic engine performance. However, generally combination of the above-mentioned conductive filler ** tends to cause reinforcement and fluid aggravation. Therefore, if target electric conduction level is obtained, the fewer possible one of the loadings of the above-mentioned conductive

filler is desirable. Although target electric conduction level changes with applications, volume resistivity exceeds 100ohm and cm, and the range of it is usually 1010 or less ohm-cm.

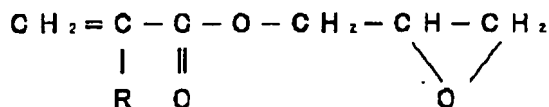
[0056] Next, it sets [the semantics which obtains the outstanding toughness and extrusion-molding nature] and is desirable to blend the thermoplastics containing at least one sort of functional groups chosen from the (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and carboxylate in this invention.

[0057] As thermoplastics containing this functional group, an olefin system polymer, a fluorine system polymer, etc. containing at least one sort chosen from an epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and carboxylate can be illustrated.

[0058] As an epoxy group content polyolefine system polymer, what carried out epoxy oxidation of the double bond parts of the olefin system copolymer which has glycidyl ester, glycidyl ether, glycidyl diamine, etc., and the olefin system copolymer which has a double bond is mentioned to a side chain, the olefin system copolymer with which copolymerization of the monomer which has an epoxy group especially was carried out is suitable, and the olefin system copolymer which makes the main constituent especially the glycidyl ester of alpha olefin and alpha, and beta-partial saturation acid is used suitably.

[0059] As an example of this alpha olefin, ethylene, a propylene, butene-1, 4-methyl pentene -1, a hexene 1, decene -1, octene -1, etc. are mentioned, and ethylene is used preferably especially. Moreover, these can also use two or more sorts for coincidence.

[0060] On the other hand, the glycidyl ester of alpha and beta-partial saturation acid is a general formula [** 1].



a compound shown by (R shows a hydrogen atom or a low-grade alkyl group here) comes out, and there is, metaglycidyl acrylate, glycidyl methacrylate, glycidyl ethacrylate, etc. are specifically mentioned, and glycidyl methacrylate is used preferably especially.

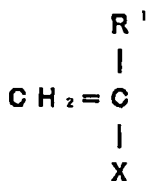
[0061] the olefin system copolymer which makes the main constituent the glycidyl ester of this alpha olefin and alpha, and beta-partial saturation acid -- the random of the above-mentioned alpha olefin and the glycidyl ester of alpha and beta-partial saturation acid, alternation, a block, and a graft copolymer -- you may be which copolymerization format.

[0062] The amount of copolymerization of the glycidyl ester of an alpha olefin and alpha, alpha in the olefin system copolymer which makes the glycidyl ester of beta-partial saturation acid the main constituent, and beta-partial saturation acid has 3 - 30 especially desirable % of the weight 0.5 to 40% of the weight from viewpoints, such as effect on the effect on the effectiveness made into the purpose, polymerization nature, gelation, thermal

resistance, a fluidity, and reinforcement. The epoxy group content olefin system copolymer which uses as an indispensable component the monomer (3) which is further shown by the following general formula as an epoxy group content olefin system copolymer in this invention in addition to the glycidyl ester (2) of an alpha olefin (1) and alpha and beta-partial saturation acid is also used suitably.

[0063]

[Formula 2]



(Here, R¹ shows hydrogen or a low-grade alkyl group, and X is -COOR². Radical chosen from the radical, -CN radical, or the aromatic series radical) Moreover, R² The alkyl group of carbon numbers 1-10 is shown.

The detail of the glycidyl ester (2) of the alpha olefin (1) used for this olefin system copolymer and alpha and beta-partial saturation acid is the same as that of (B) olefin system copolymer.

[0064] On the other hand as an example of a monomer (3), a methyl acrylate, an ethyl acrylate, Acrylic-acid n-propyl, acrylic-acid isopropyl, acrylic-acid n-butyl, Acrylic-acid t-butyl, isobutyl acrylate, a methyl methacrylate, Ethyl methacrylate, methacrylic-acid n-propyl, methacrylic-acid isopropyl, alpha, such as n-butyl methacrylate, t-butyl methacrylate, and methacrylic-acid isobutyl, beta-unsaturated-carboxylic-acid alkyl ester, Acrylonitrile, styrene, alpha methyl styrene, the styrene by which the ring was permuted by the alkyl group, an acrylonitrile styrene copolymer, etc. are mentioned, and these can also use two or more sorts for coincidence.

[0065] These olefin system copolymers may be the random of the glycidyl ester (2) and the monomer (3) of an alpha olefin (1) and alpha and beta-partial saturation acid, alternation, a block or/and a graft copolymer, and which copolymerization format, for example, may be copolymers with which two or more sorts of copolymerization formats the monomer (3) carried out [formats] graft copolymerization to the random copolymer of the glycidyl ester (2) of an alpha olefin (1) and alpha and beta-partial saturation acid were put together.

[0066] Glycidyl ester (2) =60-99 % of the weight / 40 - 1% of the weight of the range of alpha olefin (1) / alpha, and beta-partial saturation acid is preferably chosen from viewpoints, such as effect on the effect on the effectiveness which makes the copolymerization rate of an olefin system copolymer the purpose, polymerization nature, gelation, thermal resistance, a fluidity, and reinforcement. Moreover, as for the copolymerization rate of a monomer (3), the range of monomer (3)5-60 % of the weight is preferably chosen to 95 - 40 % of the weight of total quantities of the glycidyl ester (2) of an alpha olefin (1) and alpha and beta-partial saturation acid.

[0067] Moreover, it is suitably used by this invention. As a polyolefine system polymer containing a carboxyl group and its salt, a carboxylate radical, and an acid-anhydride radical Polyethylene, polypropylene, polystyrene, ethylene propylene rubber, An ethylene-butene copolymer, polybutene, an ethylene-propylene-diene copolymer, A styrene-butadiene copolymer, a styrene-butadiene-styrene block copolymer (SBS), A styrene-isoprene-styrene block copolymer (SIS), polybutadiene, Butadiene Acrylonitrile, polyisoprene, a butene-isoprene copolymer, A styrene-ethylene butylene-styrene block copolymer (SEBS), To polyolefine system resin, such as a styrene-ethylene propylene-styrene block copolymer (SEPS), a maleic-acid anhydride, A succinic acid anhydride, a fumaric-acid anhydride, an acrylic acid, a methacrylic acid, vinyl acetate, and its Na, Salts, such as Zn, K, calcium, and Mg, a methyl acrylate, a methyl methacrylate, An ethyl acrylate, ethyl methacrylate, acrylic-acid propyl, methacrylic-acid propyl, The olefin system copolymer with which copolymerization of butyl acrylate, the methacrylic-acid butyl, etc. was carried out is mentioned. More specifically An ethylene-methyl-acrylate copolymer, an ethylene-ethyl-acrylate copolymer, An ethylene-acrylic-acid n-propyl copolymer, an ethylene-acrylic-acid isopropyl copolymer, An ethylene-acrylic-acid n-butyl copolymer, an ethylene-acrylic-acid t-butyl copolymer, An ethylene-isobutyl acrylate copolymer, an ethylene-methyl-methacrylate copolymer, An ethylene-ethyl methacrylate copolymer, an ethylene-methacrylic-acid n-propyl copolymer, An ethylene-methacrylic-acid isopropyl copolymer, an ethylene-n-butyl methacrylate copolymer, Olefin-(meta) acrylic ester copolymers, such as an ethylene-t-butyl methacrylate copolymer and an ethylene-methacrylic-acid isobutyl copolymer, A methyl-acrylate-acrylonitrile copolymer, a methacrylic acid methyl-acrylonitrile copolymer, An acrylic-acid propyl-acrylonitrile copolymer, a methacrylic acid propyl-acrylonitrile copolymer, A butyl acrylate-acrylonitrile copolymer, a methacrylic acid butyl-acrylonitrile copolymer, etc., An acrylic ester-acrylonitrile copolymer, an ethylene-(meta) acrylic-acid copolymer, and its Na, (Meta) Metal salts, such as Zn, K, calcium, and Mg, an ethylene-maleic-acid anhydride copolymer, An ethylene-butene-maleic-acid anhydride copolymer, an ethylene-BUTEN maleic-acid anhydride copolymer, An ethylene-maleic-acid anhydride copolymer, a propylene-maleic-acid anhydride copolymer or the maleic-anhydride denaturation SBS and SIS, SEBS, SEPS, an ethylene-ethyl-acrylate copolymer, etc. can be illustrated.

[0068] Especially a limit may not be in the copolymerization format of this olefin system copolymer, and a random copolymer, a graft copolymer, a block copolymer, etc. may be which copolymer formats.

[0069] the range of the 1 - 100 weight section chooses the loadings of the thermoplastics containing at least one sort of functional groups chosen from the above-mentioned (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and a carboxylate radical from points, such as toughness, surface smooth nature, and extrusion-molding nature, to the (A) thermoplastics 100 weight section -- having -- desirable -- 1 - 50 weight section -- the range of 1 - 20 weight section is chosen more preferably.

[0070] Moreover, the thermoplastics containing the above-mentioned (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from a KARUBO acid ester group may use together the two or more sorts.

[0071] Furthermore, it is also possible to use together the thermoplastics containing at least one sort of functional groups chosen from the above-mentioned (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and a carboxylate radical and (D) olefin system (**) polymer which does not contain a functional group.

[0072] As a (D) olefin system (**) polymer which does not contain this functional group, ethylene propylene rubber, an ethylene-butene copolymer, polybutene, an ethylene-propylene-diene copolymer, a styrene-butadiene copolymer, polybutadiene, Butadiene Acrylonitrile, polyisoprene, a butene-isoprene copolymer, SBS and SIS, SEBS, SEPS, etc. are mentioned.

[0073] Ethylene propylene rubber, an ethylene-butene copolymer, and especially an ethylene-propylene-diene copolymer are desirable especially.

[0074] This (D) olefin system (**) polymer may use together and use two or more sorts.

[0075] The thermoplastics constituent of this invention is a constituent excellent in multilayer shaping with the resin constituent which contains the object for multilayer blow molding, and the resin constituent ***** (low 2) polyamide resin which contains polyphenylene sulfide resin at least 30% of the weight or more especially (low 1) at least 30% of the weight or more.

[0076] The polyamide resin used for (low 2) here is a polyamide which makes a main constituent amino acid, a lactam or diamine, and dicarboxylic acid. As an example of representation of the main constituent, 6-aminocaproic acid, 11-amino undecanoic acid, Amino acid, such as 12-amino dodecanoic acid and an paraamino methyl benzoic acid, Lactams, such as epsilon-amino caprolactam and omega-RAURO lactam, a tetramethylenediamine, Hexa MEREN diamine, undecamethylene diamine, dodeca methylene diamine, 2, 2, 4-/4, a 4-trimethyl hexamethylenediamine, 5-methyl nonamethylene diamine, [2 and 4] Meta-xylene diamine, PARAKI silylene diamine, 1, a 3-bis(aminomethyl) cyclohexane, 1, a 4-bis(aminomethyl) cyclohexane, 1-friend no 3-aminomethyl 3 and 5, 5-trimethylcyclohexane, Bis(4-amino cyclohexyl) methane, bis(3-MECHIRU 4-amino cyclohexyl) methane, A 2 and 2-bis(4-amino cyclohexyl) propane, a bis(aminopropyl) piperazine, Aliphatic series, such as an aminoethyl piperazine and 2-methyl pentamethylene diamine, The diamine of an alicycle group and aromatic series and an adipic acid, a SUPERIN acid, an azelaic acid, A sebacic acid, dodecane diacid, a terephthalic acid, isophthalic acid, 2-chloro terephthalic acid, 2-methyl terephthalic acid, 5-methyl isophthalic acid, 5-sodium sulfoisophtharate, The dicarboxylic acid of aliphatic series, such as a hexahydro terephthalic acid and hexahydro isophthalic acid, an alicycle group, and aromatic series is mentioned, and the polyamide homopolymer or copolymer guided from these raw materials can be respectively used in the form of independent or mixture in this invention. In this invention, a PORIKA pro amide (nylon 6), polyhexamethylene adipamide (Nylon 66), polytetra ethylene adipamide (Nylon 46),

polyhexamethylene sebacamide (Nylon 610), polyhexamethylene DODEKAMIDO (Nylon 612), the poly dodecane amide (Nylon 12), the poly undecane amide (Nylon 11), polyhexamethylene terephthalamide (nylon 6 T), poly xylylene adipamide (nylon XD6) and such mixture thru/or a copolymer, etc. are mentioned as useful polyamide resin.

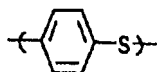
[0077] It is suitable in the semantics which acquires the toughness which excelled ** in the polyamide resin with which the carbon number per amide group consists of a structural unit which is the range of 8-15 especially, or especially the PORIKA pro amide copolymer a PORIKA pro amide homopolymer or whose KAPURO amide unit is more than 50 mol % is desirable. As this polyamide, the poly dodecane amide (Nylon 12), the poly undecane amide (Nylon 11), a PORIKA pro amide (nylon 6), etc. can be illustrated.

[0078] the relative viscosity which there is no limit especially in the polymerization degree of these polyamide resin, for example, was measured 98% at a concentrated-sulfuric-acid solution (polymer 1g, 100ml of concentrated sulfuric acid), and 25 degrees C -- the range of 1.5-7.0 -- especially -- 2.0-6.5 -- further -- the relative viscosity which could illustrate the range of 2.5-5.5, or was measured at 25 degrees C among (0.5 % of the weight of polymer concentration) the metacresol can illustrate the polyamide resin of the range of 1.0-7.0.

[0079] Especially, the polyamide resin with which the carbon number per amide group consists of a structural unit which is the range of 8-15 is desirable in the semantics which obtains the outstanding surface smooth nature, toughness, and a blow molding object moldability.

[0080] Moreover, the polyamide resin (low 2) resin constituent of this invention may contain components other than a polyamide 50 or less % of the weight preferably 70 or less % of the weight. Although there is especially no limit as components other than this polyamide, the olefin system (**) polymer above which does not contain the thermoplastics containing the thermoplastics illustrated above (A) as a desirable combination component, the (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate or a functional group is mentioned, and the detail is the same as that of the above, and is omitted.

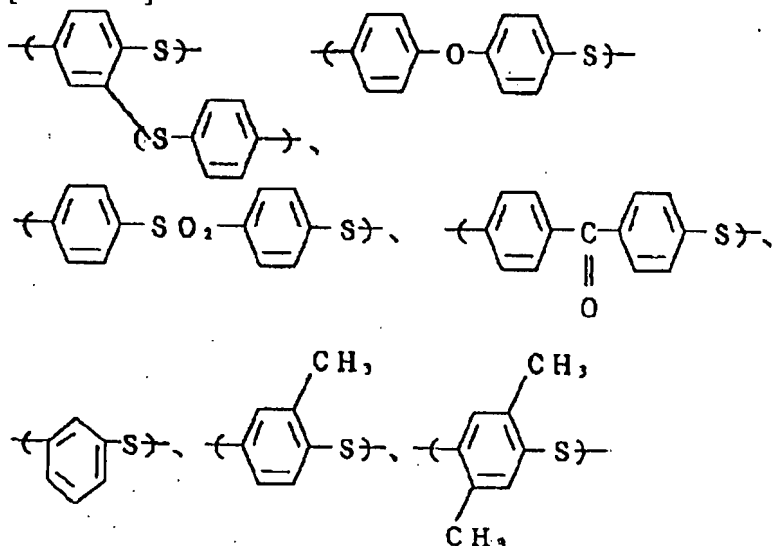
[0081] Next (low 1), the polyphenylene sulfide resin (henceforth PPS resin) used is [Formula 3] about the repeat unit shown with the following structure expression.



It is more than 70 mol % and the polymer which contains more than 90 mol % more preferably, and since thermal resistance is spoiled, the above-mentioned repeat unit is not desirable less than [70 mol %]. Moreover, P PS resin has the following structure expression, winds less than [of the repeat unit / 30 mol %], and is **. It is possible to carry out and to constitute from a unit etc.

[0082]

[Formula 4]



Although there will be especially no limit if melting kneading is possible for the melt viscosity of the PPS resin used by this invention, a 50-20,000poise (320 degrees C, shear-rate 1,000sec-1) thing is usually used, and the range which is 100-5000poise is more desirable. an approach, i.e., JP,45-3368,B, with this usually well-known PPS resin -- a publication -- The approach or JP,52-12240,B which obtains a polymer with small **** comparison-molecular weight The polymer with comparatively big molecular weight indicated by JP,61-7332,A is obtained. It can manufacture by an approach etc. PPS resin obtained as mentioned above in this invention The bottom of inert gas ambient atmospheres, such as bridge formation / macromolecule quantification by heating among air, and nitrogen, or decrease Washing by heat treatment by the draft, the organic solvent, hot water, an acid water solution, etc., an acid anhydride, amine To functional-group content compounds, such as isocyanate and a functional-group content disulfide compound of course, it is also possible to use it, after performing various processings, such as *****.

[0083] as the concrete approach in the case of constructing a bridge/macromolecule quantifying depended on heating of PPS resin -- the bottom of oxidizing gas ambient atmospheres, such as air and oxygen, or said oxidizing gas, and nitrogen -- argon temperature predetermined [in a heating container] in the bottom of a mixed-gas ambient atmosphere with which inert gas -- setting -- hope The approach of heating until the melt viscosity to carry out is obtained can be illustrated. Heat-treatment temperature is usual. 170-280 degrees C is chosen, it is 200-270 degrees C preferably, and time amount is a connoisseur. Usual state 0.5 - 100 hours are chosen, and although it is 2 - 50 hours preferably, target viscosity level can be obtained by controlling both this heat-treatment temperature and time amount. The equipment of heat-treatment is heating apparatus with a rotating type or an impeller also with usual hot air drying equipment again. Although you

may be, it is more desirable to use heating apparatus with a rotating type or an impeller for homogeneity efficient moreover more at a processing sake.

[0084] As the concrete approach in the case of heat-treating under inert gas ambient atmospheres, such as nitrogen, or reduced pressure, PPS resin is heated under inert gas ambient atmospheres, such as nitrogen, or reduced pressure. 200-270 degrees C and heating time can illustrate the approach of heat-treating preferably for 2 to 50 hours preferably the processing temperature of 150-280 degrees C for 0.5 to 100 hours. Heat-treatment Equipment is heating apparatus with a rotating type or an impeller also in usual hot air drying equipment again. Although it is good, in order to process to homogeneity more moreover efficiently, it is more desirable to use heating apparatus with a rotating type or an impeller.

[0085] As for the PPS resin used by this invention, it is desirable that it is PPS resin to which deionization processing was performed. As the concrete approach of this deionization processing, acid water-solution washing processing, hot-water-cleaning processing, organic solvent washing processing, etc. can be illustrated, and these processings may be used combining two or more sorts of approaches.

[0086] The following approaches can be illustrated as the concrete approach in case an organic solvent washes PPS resin. namely, operation which disassembles PPS resin as an organic solvent used for washing etc., although there will be especially no limit if not had For example, N-methyl pyrrolidone, nitrogen-containing polar solvents, such as dimethylformamide and dimethylacetamide, Dimethyl Sulfoxide sulfone system solvents, such as a sulfoxide and a dimethyl sulfone, aceto Ketone solvent, such as N, a methyl ethyl ketone, a diethyl ketone, and an acetophenone The ether, such as wood ether, dipropyl ether, and a tetrahydrofuran System solvent, Chloroform, a methylene chloride, a trichloroethylene, 2 ethylene chlorides, Halogen system solvents, such as dichloroethane, tetrachloroethane, and chlorobenzene, methanol, ethanol, propanol, a butanol, a pentanol, ethylene A glycol, propylene glycol, a phenol, cresol, and polyethylene RENGU Alcoholic phenol system solvents, such as a recall, benzene, toluene, and xylene etc. -- an aromatic hydrocarbon system solvent etc. is raised. It is N in these organic solvents. - Use of a methyl pyrrolidone, an acetone, dimethylformamide, chloroform, etc. It is desirable. Moreover, these organic solvents are used by one kind or two kinds or more of mixing. It is carried out. As the approach of washing by the organic solvent, it is ***** about PPS resin in an organic solvent. It is also possible for there to be approaches, such as to close, and to agitate or heat suitably as occasion demands. . There is especially no limit about the washing temperature at the time of an organic solvent washing PPS resin, and it is a usual state. The temperature of about [** -300 degree C] arbitration can be chosen. It is washing effectiveness, so that washing temperature becomes high. Although there is an inclination which becomes high, effectiveness is usually enough acquired at ordinary temperature -150 degree C washing temperature. **. Moreover, as for the PPS resin to which organic solvent washing was performed, it is desirable to wash several times with water or warm water in order to remove a remaining organic solvent.

[0087] The following approaches can be illustrated as the concrete approach in the case of processing PPS resin with hot water. That is, the effectiveness of the desirable chemical denaturation of the PPS resin by hot water cleaning is discovered. And, as for the water to be used, it is desirable that they are distilled water or deionized water. Hot water processing Actuation feeds the PPS resin of the specified quantity into the water of the specified quantity, and is ordinary pressure, or is usually a pressure. It is carried out by heating and agitating within a container. The rate of PPS resin and water is water.

Although more ones are desirable, it is [as opposed to / usually / 1l. of water] 200g or less of PPS resin. A bath ratio is chosen.

[0088] The following approaches can be illustrated as the concrete approach in the case of carrying out acid treatment of the PPS resin. That is, there is the approach of making it PPS resin immersed in the water solution of an acid or an acid etc., It is also possible to agitate or heat suitably as occasion demands. The acid used is PPS. If it does not have the operation to decompose, there will be especially no limit. A formic acid, an acetic acid, propione Aliphatic series saturation monocarboxylic acid, such as an acid and butanoic acid, Ha, such as a chloroacetic acid and dichloroacetic acid RO permutation aliphatic series saturation carboxylic acid, Aliphatic series partial saturation monochrome, such as an acrylic acid and a crotonic acid A carboxylic acid, a benzoic acid, Aromatic carboxylic acid, such as a salicylic acid, oxalic acid, chestnut Dicarboxylic acid, such as an acid, a succinic acid, a phthalic acid, and a fumaric acid, a sulfuric acid, a phosphoric acid, and hydrochloric acid, Inorganic-acid nature compounds, such as carbonic acid and silicic acid, etc. are raised. An acetic acid and a hydrochloric acid are ** more especially. Better *****. The PPS resin to which acid treatment was performed is a remaining acid or a remaining salt etc. In order to remove, it is desirable to wash several times with water or warm water. Moreover, it uses for washing. **** is semantics which does not spoil the effectiveness of the desirable chemical denaturation of the PPS resin by acid treatment. It is desirable that they are distilled water and deionized water.

[0089] Moreover, the polyphenylene sulfide (low 1) resin resin constituent of this invention may contain components other than a polyphenylene sulfide 50 or less % of the weight preferably 70 or less % of the weight. Although there is especially no limit as components other than this polyphenylene sulfide, the olefin system (**) polymer above which does not contain the thermoplastics containing the thermoplastics illustrated above (A) as a desirable combination component, the (C) epoxy group, an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate or a functional group is mentioned, and the detail is the same as that of the above, and is omitted.

[0090] Moreover, the addition to the (b) polyphenylene sulfide resin constituent of the alkoxysilane which has at least one sort of functional groups chosen from an epoxy group, the amino group, the isocyanate radical, the hydroxyl group, the sulfhydryl group, and the ureido radical is effective in improvement in the outstanding mechanical strength and toughness.

[0091] As an example of this compound, gamma-glycidoxypentyltrimethoxysilane, Epoxy group content alkoxysilane compounds, such as gamma-glycidoxy pentyl TORIETOKISHISHI silane and beta-(3, 4-epoxycyclohexyl) ethyltrimethoxysilane, Sulfhydryl group content alkoxysilane compounds, such as gamma-mercapto pentyltrimethoxysilane and gamma-mercapto pentyl triethoxysilane, gamma-ureido pentyl triethoxysilane, gamma-ureido pentyl trimethoxy SHISHIRAN, Ureido radical content alkoxysilane compounds, such as gamma-(2-ureido ethyl) aminopentyl trimethoxysilane, gamma-isocyanato pentyl triethoxysilane, gamma-isocyanato pentyltrimethoxysilane, gamma-isocyanato pentylmethyl dimethoxysilane, gamma-isocyanato pentylmethyl diethoxysilane, gamma-isocyanatopentylethyl dimethoxyshiran, gamma-isocyanatopentylethyl diethoxysilane, Isocyanato group content alkoxysilane compounds, such as gamma-isocyanato pentyl trichlorosilane, gamma-(2-aminoethyl) aminopentyl methyl dimethoxysilane, Amino-group content alkoxysilane compounds, such as gamma-(2-aminoethyl) aminopentyl trimethoxysilane and gamma-aminopentyl trimethoxysilane, Hydroxyl-group content alkoxysilane compounds, such as gamma-hydroxypentyl trimethoxysilane and gamma-hydroxypentyl triethoxysilane, etc. are mentioned. Especially Gamma-glycidoxypentyltrimethoxysilane, gamma-glycidoxy pentyl TORIETOKISHISHI silane, Epoxy group content alkoxysilane compounds, such as beta-(3, 4-epoxycyclohexyl) ethyltrimethoxysilane, gamma-ureido pentyl triethoxysilane, gamma-ureido pentyl trimethoxy SHISHIRAN, Ureido radical content alkoxysilane compounds, such as gamma-(2-ureido ethyl) aminopentyl trimethoxysilane, gamma-(2-aminoethyl) aminopentyl methyl dimethoxysilane, Amino-group content alkoxysilane compounds, such as gamma-(2-aminoethyl) aminopentyl trimethoxysilane and gamma-aminopentyl trimethoxysilane, gamma-isocyanato pentyl triethoxysilane, gamma-isocyanato pentyltrimethoxysilane, gamma-isocyanato pentylmethyl dimethoxysilane, gamma-isocyanato pentylmethyl diethoxysilane, Especially isocyanato group content alkoxysilane compound **, such as gamma-isocyanatopentylethyl dimethoxyshiran, gamma-isocyanatopentylethyl diethoxysilane, and gamma-isocyanato pentyl trichlorosilane, are desirable.

[0092] To the polyphenylene sulfide resin 100 weight section, the range of 0.05 - 5 weight section is chosen, and the range of 0.1 - 3 weight section is more desirable, and, as for the desirable addition of this alkoxysilane compound, it is usually chosen.

[0093] Furthermore according to the purpose and an application, fibrous and/or an un-fibrous filler may be blended with (A) thermoplastics constituent of this invention and (low 1) a polyphenylene sulfide resin constituent, and a polyamide resin (low 2) constituent in the range which does not spoil the range of this invention. As an example of fibrous [this] and/or an un-fibrous filler A glass fiber, a glass milled fiber, a carbon fiber, titanite KARIWISUKA, A zinc-oxide whisker, a boric acid aluminum whisker, an aramid fiber, an alumina fiber, Fibrous bulking agents, such as silicon carbide fiber, ceramic fiber, an asbestos fiber, stone KOU fiber, and a metal fiber, A WARASUTE night, a zeolite, a sericite, a kaolin, a mica, clay, Silicate, such as pyrophyllite, a bentonite,

asbestos, talc, and alumina silicate, An alumina, oxidization silicon, magnesium oxide, a zirconium dioxide, titanium oxide, Carbonates, such as metallic compounds, such as an iron oxide, a calcium carbonate, a magnesium carbonate, and a dolomite, Sulfates, such as a calcium sulfate and a barium sulfate, a magnesium hydroxide, Un-fibrous bulking agents, such as hydroxides, such as a calcium hydroxide and an aluminum hydroxide, a glass bead, a ceramic bead, boron nitride, silicon carbide, and a silica, may be mentioned, these may be hollow, and it is also possible to use together two or more kinds of these bulking agents further. Moreover, it is desirable to use them by coupling agents, such as an isocyanate system compound, an organic silane system compound, an organic titanate compound, an organic borane system compound, and an epoxy compound, carrying out conditioning of fibrous [these] and/or the un-fibrous filler in the semantics which obtains the more excellent mechanical strength.

[0094] Furthermore, to the thermoplastics constituent of this invention and (low 1) a polyphenylene sulfide resin constituent, and a polyamide resin (low 2) constituent, the usual additives, such as a plasticizer, a crystalline-nucleus agent, a coloring inhibitor, an antioxidant, a thermostabilizer, lubricant, an ultraviolet-rays inhibitor, a coloring agent, a flame retarder, and a foaming agent, can be added.

[0095] It is in the key objective of this invention obtaining the thermoplastics constituent which is conductivity and was excellent in surface smooth nature. When the gut which supplied to the melt indexer (315.5 degrees C, residence-time 5 minutes, 5kg of loads, the orifice diameter of 0.0825 inches, die length of 0.315 inches), and was obtained is specifically projected with a projector, five or less projections [two or less] per cm with a height of 25 micrometers or more observed on a gut front face are one or less thermoplastics constituent especially preferably preferably.

[0096] In order to obtain this outstanding surface smooth nature, it is effective to apply the thermoplastics of the amount of macromolecules comparatively as (A) thermoplastics, as mentioned above.

[0097] Moreover, in many cases, (A) thermoplastics can come to hand by the pellet type, but this pellet is ground and granulation or the approach of presupposing that it is powdered and carrying out melting kneading of this with (B) conductivity filler 2mm or less also has effective weighted mean particle diameter on a surface smooth disposition. Moreover, this weighted mean particle diameter may use together granulation or powder 2mm or less with (A) thermoplastics of a pellet type.

[0098] Furthermore, (A) thermoplastics, (B) conductivity filler, and the (C) epoxy group, When the thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate is used, (A) The constituent and the (C) epoxy group which were able to obtain thermoplastics and (B) conductivity filler after melting kneading, The approach of carrying out melting kneading of the thermoplastics containing an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate is also effective on a surface smooth disposition.

[0099] As for the resin constituent of this invention, it is desirable that 270 degrees C and 1000-20000poise of melt viscosity measured in the 1000/second of shear rates are 1000-10000poise especially. Especially this is quite hyperviscosity when the polyamide resin with which the carbon number per amide group consists of a structural unit which is the range of 8-15 as (A) thermoplastics is used, and it is hard to say it to the usual blow molding as desirable requirements. At least two sorts of resin constituents of the resin constituent which contains a thermoplastics constituent and (low 1) polyphenylene sulfide resin at least 30% of the weight or more are used. however, (**) which is one purpose of this invention -- In acquiring the multilayer blow molding object manufactured by the coextrusion process In order to carry out the laminating of a polyphenylene sulfide resin constituent layer with the high (low 1) melting point, and the (b) thermoplastics constituent layer, a (b) thermoplastics constituent is exposed to the temperature of at least 250 degrees C or more. As for a (b) thermoplastics constituent, in the semantics which obtains the moldability excellent in these temperature conditions, it is desirable to have the high melt viscosity like ****.

[0100] If the front-face nature which was excellent in the preparation approach of the thermoplastics constituent of this invention the account of a top is obtained, there is especially no limit, for example, it can mention the approach of supplying the mixture of a raw material to usually well-known melting mixers, such as a monopodium or a biaxial extruder, a Banbury mixer, a kneader, and a roll mill, and kneading it at temperature higher 10-80 degrees C than the melting point of thermoplastics, and desirable temperature high 20-50 degrees C etc. as an example of representation.

[0101] Moreover, the approach of considering as the multistage kneading method which carries out melting kneading of the thermoplastics containing the constituent and the (C) epoxy group which were able to obtain the above-mentioned (A) thermoplastics and (B) conductivity filler after melting kneading, an acid-anhydride radical, a carboxyl group and its salt, and at least one sort of functional groups chosen from carboxylate, supplying the 1st step of compound from the main hopper, and supplying the 2nd step of compound from a side feeder is also mentioned.

[0102] Furthermore, in using a little additive component, after kneading and pelletizing other components by the above-mentioned approach etc., of course, it is also possible to add before fabrication and to present shaping.

[0103] The constituent of this invention is suitable for manufacture of blow molding objects, such as a tube Plastic solid and a blow molding object. For manufacture of the multilayer blow molding object by co-extrusion, especially the suitable blow molding object of this invention obtained by doing in this way It excels in thermal resistance, hot water resistance, chemical resistance, toughness, and a mold-goods appearance. From this description as extrusion-molding articles, such as blow molding articles, such as a bottle, a tank, and a duct, a pipe, a tube, and a fuel tube Although it is effective in autoparts especially an internal combustion engine application, the electrical and electric equipment and electronic parts, and a chemical application, of course, not only this blow molding

method but application by other fabricating methods, such as other extrusion methods, such as the round bar, an injection-molding method, and a transfer-molding method, is possible.

[0104]

[Example] Although an example is shown below and this invention is explained to it still more concretely, this invention is not limited to the publication of these examples.

[0105] Moreover, the surface smooth nature in the following examples, impact strength with a notch, and tube toughness were performed by the following approach.

[0106] The [surface smooth nature] resin constituent pellet was supplied to the melt indexer (Oriental energy machine company make, Type C-5059D 2-1, the orifice diameter of 0.0825 inches, die length of 0.315 inches), the 5-minute stagnation back was extruded with the melting point of +60 degrees C of thermoplastics, and the gut was extruded by 5kg of loads. The gut of a ten deed was obtained for this actuation 10 times. This gut was projected with the projector (the NIKON CORP. make, a profile projector, V-12), and the number of projections with a height [on the front face of a gut] of 25 micrometers or more was observed. It is ***** to the number of projections which performs observation about ten gut every 5cm and a total of 50cm, and is observed by per cm.

[0107] Injection molding was presented with the [impact strength with notch] conductive resin constituent pellet under the condition with a melting point [of (A) thermoplastics / of +50 degrees C], and a die temperature of 80 degrees C, and the measurement sample was fabricated. According to ASTM D256 law, notch Izod impact strength was measured using this sample.

[0108] Using [volume resistivity] resin constituent pellet, the Plastic solid with a thickness [of 0.3cm] and a diameter of 100mm was fabricated with injection molding under the condition with a melting point [of resin temperature: (A) thermoplastics / of +50 degrees C], and a die temperature of 70 degrees C, and this was made into the sample. In measurement, it is TR6877 made from Takeda Riken Industry. It was with Computing Digital Multimeter.

[0109] The melt viscosity under 270 degrees C and the conditions of the 1000/second of shear rates was measured with the flow tester using the [melt viscosity measurement] resin constituent pellet.

[0110] Ten tubes with a [tube low-temperature toughness evaluation] die length of 30cm were prepared, and this was left in the -40-degree C cooling system for 4 hours. The tube was picked out from the cooling system, the 0.454kg spindle was fallen from height of 304.8mm to up to the tube, and the existence of destruction of a tube was observed.

[0111] [The compounding agent used in the example and the example of a comparison] (A) thermoplastics A-1: -- Nylon 12 (relative viscosity 2.2) pellet A-2: Nylon 12 (relative viscosity 1.4) pellet A-3: -- Nylon 12 (relative viscosity 1.4) -- grinding -- the weighted mean particle size of 0.8mm -- it was presupposed that it is powdered.

[0112] A-4: Nylon 12 (relative viscosity 2.2) -- grinding -- the weighted mean particle size of 0.8mm -- it was presupposed that it is powdered.

[0113] In addition, the above-mentioned relative viscosity was measured at 25 degrees C among (0.5 % of the weight of polymer concentration) the metacresol. Moreover, weighted mean particle size was measured by the centrifuge.

[0114] A-5: Nylon 6 (relative viscosity 2.4) pellet relative viscosity was measured 98% at a concentrated-sulfuric-acid solution (polymer 1g, 100ml of concentrated sulfuric acid), and 25 degrees C.

[0115] A-6: Polybutylene terephthalate (relative viscosity 2.0)

Relative viscosity measured the alt.chlorophenol solution at 25 degrees C 0.5%.

[0116] (B) conductive filler B-1: -- carbon black (KETCHIEN Black International EC600 JD and DBP oil absorption [of 495ml]/-- BET adsorption method surface area 100g) 1270m² / g, 30nm of mean diameters, and ash content 0.2%B-2:carbon black (Mitsubishi Kasei industrial Mitsubishi conductivity car BONBBU rack # 3050 and DBP oil absorption [of 180ml]/-- 100g) BET adsorption method surface area of 75m² / g, 0.2% (C) functional group of ash content Thermoplastics C-1 to contain : An alpha olefin And the glycidyl ester of alpha and beta-partial saturation acid The olefin system copolymer ethylene / glycidyl methacrylate =94/6 (% of the weight) copolymer C-2 made into the main constituent : An alpha olefin and alpha, The olefin system copolymer ethylene / glycidyl methacrylate =88/12 (% of the weight) copolymer C-3 which makes the glycidyl ester of beta-partial saturation acid the main constituent : A maleic-anhydride (0.5wt%) denaturation ethylene propylene rubber (D) epoxy group, an acid-anhydride radical, The elastomer D-1 which does not contain a carboxyl group and its salt, and a carboxylate radical: The resin constituent low 1:polyphenylene sulfide which constitutes ethylene / butene-1 =82 / 18 (% of the weight) copolymer (b) layer (310 degrees C) The constituent which consists of 25 % of the weight (above C-2) of thermoplastics with which the melt viscosity in the 1000/second of shear rates contains 900poise 55 % of the weight, 20 % of the weight (above A-1) of Nylon 12, and a functional group.

** -2: Nylon 12 ("Lil Sun" AESN O TL) [, Toray Industries, Inc.,]

After carrying out dryblend at a rate which shows each charge of a compounding agent shown in examples 1 and 4 and nine table 1 in Table 1 and carrying out preliminary mixing for 2 minutes with a tumbler, melting kneading was carried out with the biaxial extruder which set the cylinder temperature as the melting point of +35 degrees C of (A) thermoplastics, it pelletized by the strand cutter and 1 evening desiccation was carried out. Using this pellet, the Plastic solid for impact strength and volume resistivity measurement was fabricated, and surface smooth nature and melt viscosity were measured. A result is shown in Table 1.

[0117] After carrying out dryblend at a rate which shows (A) thermoplastics and (B) conductivity filler in Table 1 among each charge of a compounding agent shown in examples 2 and 3 and five to 8 table 1 and carrying out preliminary mixing for 2 minutes with a tumbler, melting kneading was carried out with the biaxial extruder which set the cylinder temperature as the melting point of +35 degrees C of (A) thermoplastics, it pelletized by the strand cutter and 1 evening desiccation was carried out. Next, after

carrying out preliminary mixing of the pellet and (C) functional-group content thermoplastics (elastomer which does not contain the (D) functional group) to apply for 2 minutes with a tumbler, melting kneading was carried out with the biaxial extruder which set the cylinder temperature as the melting point of +35 degrees C of (A) thermoplastics, it pelletized by the strand cutter and 1 evening desiccation was carried out. Using this pellet, the Plastic solid for impact strength and volume resistivity measurement was fabricated, and surface smooth nature and melt viscosity were measured. A result is shown in Table 1. [0118] Melting kneading, pelletizing, and desiccation were performed like examples 1 and 4 except having used A-2 as example 1-2 (A) thermoplastics of a comparison. Using this pellet, the Plastic solid for impact strength and volume resistivity measurement was fabricated, and surface smooth nature and melt viscosity were measured. A result is shown in Table 1.

[0119] Tube shaping evaluation (1)

The two-layer tube (outer-diameter:8mm, bore:6mm, outer layer thickness:0.8mm, and inner layer thickness:0.2mm) was fabricated using the pellet which was obtained by Law 2 in the outer layer, and was obtained by the inner layer in the example 4 or the example 2 of a comparison. Tube shaping was performed for the dice which collects the resin breathed out as shaping equipment from two sets of two sets of the 65mm single screw extruders set as the resin temperature of 240 degrees C, and these extruders by the adapter, and is fabricated in the shape of a tube, the sizing die which cools a tube and carries out dimension control, and the thing which consists of a taking over machine by part for 50cm/in use and taking over rate, and the sample for inside smooth nature and tube low-temperature toughness evaluation was extracted. When the pellet of the example 2 of a comparison was used, it was the result of accepting a projection in an inside and being inferior to smooth nature. Moreover, by tube low-temperature toughness evaluation, the crack was accepted by five among ten. On the other hand, when the pellet of an example 2 was used, inside smooth nature is good and a crack was not accepted for one among ten in tube low-temperature toughness evaluation, either.

[0120] Tube shaping evaluation (2)

an outer layer -- a low -- 2 and an interlayer -- a low -- outer-diameter:8mm, bore:6mm, outer layer thickness:0.7mm, the interlayer thickness of 0.15mm, and a inner layer thickness:0.1mm three-layer tube were fabricated using the pellet obtained by 1 and the inner layer in an example 3 or the examples 1 and 2 of a comparison. Three sets of the 65mm single screw extruders set as the resin temperature of 210-290 degrees C as shaping equipment The dice which collects the resin breathed out from three sets of these extruders by the adapter (temperature of 270-290 degrees C), and is fabricated in the shape of a tube, Tube shaping was performed for the sizing die which cools a tube and carries out dimension control, and the thing which consists of a taking over machine by part for 50cm/in use and taking over rate, and the sample for inside smooth nature and tube low-temperature toughness evaluation was extracted.

[0121] When the pellet of the examples 1 and 2 of a comparison was used, it was the result

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of accepting a projection in an inside and being inferior to smooth nature. Moreover, by tube low-temperature toughness evaluation, when the example 1 of a comparison was used and 2 and the example 2 of a comparison were used among ten, the crack was accepted by six among ten. Moreover, when the example 2 of a comparison was used, it was the result of a tube's becoming flat and being inferior to perfect circle nature in the state of melting, since viscosity is too low. On the other hand, when the pellet of an example 2 was used, inside smooth nature is good and a crack was not accepted for one among ten in tube low-temperature toughness evaluation, either.

[0122]

[Table 1]

表 1

成 分	実施例										比較例	
	1	2	3	4	5	6	7	8	9		1	2
(A) 熱可塑性樹脂	A-1 100	A-1 100	A-1 100	A-3 100	A-5 100	A-1 100	A-1 100	A-6 100	A-4 100		A-2 100	A-2 100
(B) 導電性 ファイラー	B-1 7	B-1 8	B-1 7	B-1 6.5	B-1 7	B-1 7	B-2 48	B-1 10	B-1 7		B-1 7	B-1 6.5
(C) 官能基含有 熱可塑性樹脂	C-3 8	C-3 18	C-3 8	--	C-3 8	C-1/C-3 4/4	C-3 11	C-2 3	C-3 8		C-3 8	--
(D) 官能基を含有 しないエラストマー								D-1 9				
ノッチ付きアイゾット 衝撃強度 (J/m)	246	420	325	85	75	290	55	110	325		160	70
表面平滑性 (突起数、個/cm)	2.0	0.5 以下	0.5 以下	1.0	1.5	0.5 以下	3.0	1.0	0.5 以下		10以上	10以上
熔融粘度 (ポイズ)	5100	6300	5200	900	12000	7200	12000	13000	5200		4900	900
体積固有抵抗 ($\Omega \cdot \text{cm}$)	4×10^3	1×10^3	2×10^3	7×10^3	4×10^2	7×10^3	4×10^4	1×10^4	8×10^2		4×10^4	9×10^3
混練回数*	1	2	2	1	2	2	2	2	1		1	1

上段：種類、下段：配合量（重量部）

*）混練回数 1：上記組成物を 1 度に配合し混練を行った。

混練回数 2：（A）熱可塑性樹脂と（B）導電性ファイラーを熱融混練／ペレタイズ後、このペレットと（C）官能基含有熱可塑性樹脂（及び（D）官能基を含有しないエラストマー）を熱融混練した。

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